

# **GOTHIC CHURCHES IN EARLY 20<sup>TH</sup>-CENTURY CHINA: ADAPTING WESTERN BUILDING TECHNIQUES TO CHINESE CONSTRUCTION TRADITION**

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## **Keywords**

Technological transfers between Europe and China, Building techniques in response to their environments, Church architecture, History and construction of specific projects, Building archaeology, Organization of construction works.

## **Abstract**

This paper presents the first results of collaboration between the universities of Beijing and Leuven. The method of this pioneering research program confronts resources from Western missionary archives (plans, pictures, construction handbooks etc.) and building archaeological analysis of Western churches in China at the turn of the nineteenth and twentieth centuries. The aim is learning from the material source what the archives do not tell about construction and technological transfer. It is not known how technological transmission happened concretely, but there is evidence of a wide range of hybridized forms and techniques.

The paper is divided into three parts. First, an overview of church construction in China at the time of late Qing dynasty and early Republic periods. Second, an introduction to an exceptional handbook on church construction in Northern China, published by French Jesuits in 1926. Third, building archaeological investigations realized in July 2014 in the Gothic church of Daming (Hebei province), built by French Jesuits in 1917 and mentioned in the handbook of 1926.

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## INTRODUCTION

Western missionaries built many churches in China from the 1860s to the 1930s, the construction of which, of course, always was realized by Chinese. In most rural areas and small provincial towns, church building works were the first encounter between two completely different building traditions. Missionaries arrived with western models, liturgical requirements, and theoretical knowledge about construction and style, but had to adapt to the local conditions, climate, available materials, and people. From the late nineteenth century to the early 1920s, Catholic missionaries promoted Gothic style and had to train Chinese craftsmen to construct pointed arches, vaulting, western timber structures, stepped foundations, as well as producing red bricks and Gothic ornaments such as traceries, pinnacles, etc.

Until present few research has been done on this fascinating encounter (Luo 2013; Coomans 2014<sup>3</sup>). It is not known how technological transmission happened concretely, but there is evidence of a wide range of hybridized forms and techniques. This paper presents the first results of research collaboration between the School of Archaeology and Museology of Peking University and the Department of Architecture, Faculty of Engineering, of the University of Leuven. The method of this pioneering research program confronts resources from Western missionary archives and building archaeological analysis of Western churches in China. The aim is learning from the material source what the archives do not tell about construction and technological transfer.

The paper is divided into three parts. The first one gives an overview of church construction in China in late Qing and early Minguo periods. The second part introduces to an exceptional handbook on church construction in Northern China, published by French Jesuits in 1926. The third part presents the building archaeological investigations which were realized in July 2014 in Daming 大名 (Hebei province). The great gothic church of Daming was built by French Jesuits in 1917 and is mentioned as a model in the handbook of 1926.

## BUILDING CHURCHES IN CHINA

Christian missionary movements in China between 1840 and 1949 resulted in a surprising encounter between East and West, punctuated by reciprocal attractions and ‘cultural clashes’ (Tiedeman 2010). Churches built in China often were targets of the conflicts between Western imperialist interests, which included evangelization by missionaries, and xenophobic behaviour in late imperial and republican China. Every time the Emperor was forced to concede territories in the treaty ports, Western powers built churches soon. The oldest Gothic church built in China is the Anglican cathedral on the island of Hong Kong 香港 in 1844-50. After the Second Opium War and the Franco-British military expedition of 1858-60, France obtained the ‘Catholic protectorate’ and missionaries were allowed to evangelize China. From the 1860s, building churches in China, even though risky because of hostility, was no more illegal.

The construction of the cathedral of Canton 广州 (Guangzhou, Guangdong province) in the years 1863-88 is a remarkable example both of ‘cultural clash’ and technological transfer (Wiest 2004). Funded by Emperor Napoleon III, this French Gothic cathedral with two tall spires, almost a literal copy of St. Clotilde in Paris, aimed expressing France’s ‘civilizing mission’. The erection of such a symbol on the site of a wooden palace fired by French militaries was very arrogant. The construction of the cathedral lasted 25 years: plans sent from France had to be executed by Chinese workers who were totally alien and hostile to Gothic architecture. In addition to the technical difficulty of carving mouldings, constructing rib vaults, flying buttresses, window traceries, etc., vertical lines and high spires was considered disrupting the harmony of the place (风水 *fengshui*).

The French missionaries finally found a skilled stone carver from the Yunnan province, who understood the principles of Gothic structure and decoration, and carried the works to a successful conclusion. (Figure 1)

Except in the treaty ports, Christian churches built in China before 1900 were generally modest. Most of these churches have been demolished,<sup>3</sup> but are mainly known thanks to visual sources conserved in missionary archives or published in missionary journals. Above all, missionaries sought to root Christian faith according to the principle of *acculturation*, that is to say by assimilating local culture. Local converts had to feel at home in their churches. These encounters generated varied church types, depending both on the missionaries' architectural references and the local architectural traditions (Coomans 2014<sup>2</sup>, 136-153). Churches were turned towards the south and were often built on a terrace. They had no towers and were covered with a Chinese roof supported by Chinese or hybrid timber structures. (Figure 2) Only the presence of crosses and Western details from the Gothic or the Classic architectural vocabulary expressed the Christian identity of the church that had to be distinguishable from temples and houses.



Figure 1: Stone masonry and Gothic flying buttresses, Sacred Heart cathedral of Canton, 1868-88  
(© Thomas Coomans, March 2012)



Figure 2: Hybrid 'Sino-Gothic' structure, Sacred Heart church of Yangzhou 扬州 (Jiangsu province), 1864-73  
(© Thomas Coomans, April 2014)

The Boxer Rebellion climaxed in Beijing in June-August 1900. Thousands of Chinese Christians and missionaries were killed and hundreds of churches destroyed in the provinces of Hebei, Shandong, Shanxi and Inner Mongolia. The Boxer Protocol obliged the Chinese state to finance the reconstruction of churches. From then, there was no more obstacle to 'triumphant' churches in Western styles.<sup>4</sup> Very present in the public space, this architecture reinforced the 'feudal and colonial' character of Catholic missions in China and exacerbated xenophobic feelings. French, Italian, German, Belgian etc. missionaries built churches in the various national Gothic styles from Europe (Coomans 2014<sup>2</sup>; Coomans and Luo 2015). So, Alphonse De Moerloose (和羹柏 *He Geng Bai*, 1858-1932), a Scheut father who had studied architecture in Belgium, exported the Puginesque Gothic style he had learned in the 1880s to China after 1900. (Figure 3)

<sup>3</sup> Often larger churches replaced the old ones after 1900. Other were demolished during anti-Christian revolts.

<sup>4</sup> The cathedrals of Shenyang 沈阳 (Liaoning province), Jinan 济南 (Shandong province) and Kaifeng 开封 (Henan province), the West Church (*Xitang*) in Beijing, St. Ignace cathedral (*Xujiahui*) in Shanghai are Gothic. The cathedrals of Chengdu 成都 (Sichuan province), Taiyuan 太原 (Shanxi province) and Chaozhou 潮州 (Guangdong province) are Italianate.

He became the most prolific Gothic church builder in northern China (Coomans and Luo 2012). Because of the distances and the number of works, De Moerloose trained several Chinese foremen to read his plans, control the quality of building materials, deal with local workers, and direct complete building works from the foundations to the roof. From 1910 to 1929, De Moerloose's workshop was in the Trappist abbey of Jangjiaping 杨家坪 (Hebei province), 200 km northwest from Beijing 北京. He designed buildings during the winter time and visited the works during the summer. He often travelled to the treaty port of Tianjin 天津, visiting the procurators of the missionary institutes in northern China, and buying building materials such as cement, roof sheets and iron. Importing stained glass windows and sculpture from Europe was very expensive. Therefore the French Jesuits of Shanghai 上海 founded the art school of Tushanwan 土山湾, where orphans learned Western art techniques such as oil painting, stained glass painting, lithography etc. and produced church furniture in Western styles for the Chinese market (Song 2010).

After the First World War, Pope Benedict XV defined a new missionary policy in his apostolic letter *Maximum illud*, written in 1919. He condemned the colonial behaviour of superposing a Western model to any other and insisted amongst other on the necessity to integrate all aspects of local culture and develop a local clergy. In 1922, Archbishop Celso Costantini (刚恒毅 Gang Hengyi, 1876-1958) was sent as first Apostolic Delegate to China with the mission of implementing the new missionary policy based on *inculturation* or *indigenization*. He was convinced of the importance of art and promoted the development of a distinctive Chinese Christian art and architecture, known as the 'Sino-Christian style' (Coomans 2014<sup>3</sup>). Braking off with both Western and Chinese building traditions, this new style used reinforced concrete structures, even as imitation of Chinese wooden structures. (Figure 4) It was modern and answered the challenge of modernising the Chinese architectural identity (Rowe and Kuan 2002, 24-86).



Figure 3: Brick masonry, Puginesque Gothic, cathedral of Xuanhua 宣化 (Hebei province), 1903-6 (© Thomas Coomans, May 2011)



Figure 4: Sino-Christian style, reinforced concrete roof structure and bracket sets, Catholic University of Peking (辅仁大学), 1929-31 (© Thomas Coomans, September 2014)



Protestant missions also designed Chinese modern churches and university campuses. The American architect Henry Murphy (亨利·墨菲 *Hengli Mofei*, 1877-1954) designed the most remarkable Protestant educational buildings (Cody 2001). This new way of building was mostly realised by Western construction companies active in China and Hong Kong. Because of the Sino-Japanese war (1932-1945) and the Civil war (1945-1949), church building activities decreased drastically in the 1930s and stopped around 1940.

## A HANDBOOK FOR CHURCH CONSTRUCTION IN NORTHERN CHINA

A little handbook for church construction in Northern China entitled *Le missionnaire constructeur, conseils-plans* (“The missionary builder: advice-plans”) was published in 1926 ([Jung] 1926). It describes and promotes a type of Western traditional Gothic architecture from the Northern European brick countries. In Europe, this architecture was contested since the 1890s and completely outdated after World War I. In rural China, however, the techniques described in the handbook remained difficult to realize. In many villages of Northern China, building a Gothic church was an expression of a completely different architecture, which could be qualified as ‘foreign’ or ‘imported’ in contrast to the local tradition. Missionaries needed people for building their churches and trained Chinese workers to Western medieval techniques. They may therefore be considered as agents of technological and architectural transfer, but not as agents of modernity like Western architects and engineers who developed Art Deco and modernism from the 1920s in Shanghai, Nanjing (南京 Jiangsu province), Hong Kong and the treaty ports (Zhu 2009, 41-74).

The handbook is anonymously authored by ‘missionaries from Northern China’ and was published at the French Jesuits’ press of Xianxian 献县 (Hebei province). Archival research made possible to identify the author as Paul Jung (Chinese name unknown, 1863-1943), a French Jesuit who lived in China from 1897 to 1943. The handbook, which contains 67 pages of text and 54 plates, has been recently studied (Coomans 2014<sup>1</sup>).

The preface explains who the addressees are: “*This brochure is not made for cathedral builders. This is not even an essay on the famous adaptation of Chinese art in our Christian churches. Every missionary may come to be a builder, be it of a village school of only three bays. Some brothers, who are modest architects and know about building works, want to share their experience. (...) Our aim is to help in making solid, safe and not too expensive, or too ugly constructions: i.e. a beautiful church for little money.*” (Figure 5) The readership was thus French-speaking missionaries in Northern China, especially in the Christianized area of Hebei and in the surrounding provinces of Shanxi and Inner-Mongolia.

“The missionary-builder: advice and plans” is structured in eight chapters. The first deals with the choice of an appropriate location for settling a mission and its church. The second defines how to arrange buildings within a rectangular compound according to orientation, functions and Northern-Chinese climate. For churches with windows on both sides, the handbook recommends a north-south orientation, with windows on the eastern and western sides, and the door to the south. The third chapter gives recommendations about plans, estimates and contracts, and contains model contracts in Chinese concerning lime, bricks, flower bricks, tiles, stone and timber. The author stresses that it would be imprudent to work without an experienced and well-reputed contractor, responsible for recruiting, feeding and all other behaviour of the workers.

Building materials are analysed in the fourth chapter: bricks, tiles, timber, lime and ropes are the main materials in Northern China; stone and iron are barely mentioned. The indications are practical and cover most aspects of production, quality control, quantity evaluation and transport,

while assembling is developed in the subsequent chapters. The fifth chapter is dedicated to masonry: foundations, earth ramming, brickwork and mortar, saltpetre and insulating materials, placement of door and window frames. The sixth chapter polarises into contrasting Chinese and Western roofing traditions. (Figure 6) Industrial roofs in metal sheets or concrete are not mentioned, while flat earthen houses, roofs covered with grouted bricks, and flat macadam roofs only briefly. A specific chapter criticises the Chinese tradition of roof ornaments. The last chapter contains recommendations about various constructive elements: dripstones, wooden vaults, arches, stained glass, spires on bell towers, grouting walls, lime, mortar, the use of tar against saltpetre, polishing bricks, clamping walls, stove chimneys, stairs, wooden belfries, glass, furniture, varnish and oil.



Figure 5: A missionary-builder in front of his church, Lahuayingzi 拉花营子 (Inner Mongolia), 1930 (© F. Verbiest Institute, KU Leuven)

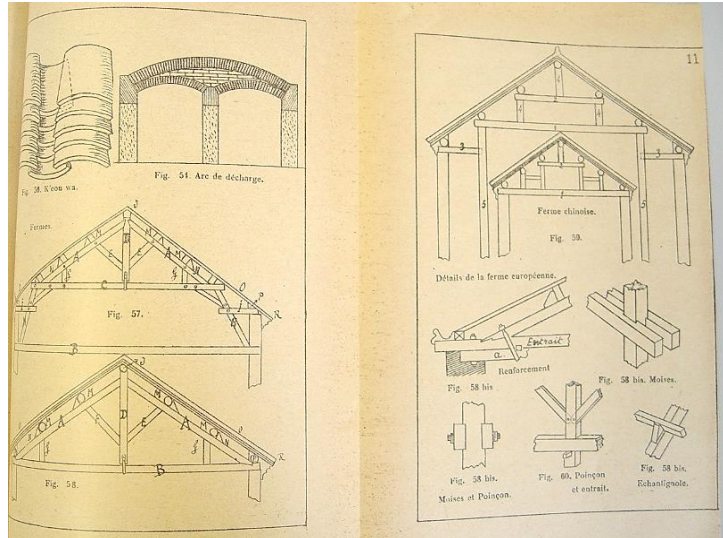


Figure 6: Western and Chinese roof structures: comparative plates from *Le missionnaire constructeur*, 1926, pl. 10-11 (© Université Laval, Québec)

The handbook's illustrations consist of 54 folded plates divided into two series: construction details (Figure 6) and plans of eight model churches. All the examples of architectonic decoration—shafts, capitals, bases, profiles, ribs, windows, etc.—are Gothic. This paradigmatic association of pointed arches and church architecture was part of the nineteenth-century worldview of the Catholic missions. The Gothic style of the model churches is simple and clearly French.

Beside technical and practical advises, the handbook contains many indications on how supervising Chinese workers, which reveal the perception the missionaries had of Chinese workers. The book contains some reflections about style. Being a conservative French missionary, still promoting Gothic architecture in the mid-1920s, the author criticizes without nuances both the traditional Chinese ornaments and the new Sino-Christian style based on *indigenization* (Coomans 2014<sup>1</sup>, 105-7).

## BUILDING ARCHAEOLOGY IN THE CHURCH OF DAMING

In July 2014, the School of Archaeology and Museology of Peking University organized a building archaeology summer school for undergraduate students in the historic center of the city of Daming 大名 (Hebei province). During one week the students analyzed and recorded the Lady church built by French Jesuit missionaries in 1917-9. This big Gothic church has been listed 'national key cultural relic' of the People's Republic of China in May 2013 (7th list). The aim of the

workshop was learning from the material source what the archives did not reveal about construction and technological transfer. Father Paul Jung, the author of the handbook from 1926, had been the director of Daming's Jesuit College and quotes several times the church in the handbook. During the fieldwork, we found his name mentioned on one of the bells of the church, as godfather of a bell cast in France and hung in the tower in 1921.<sup>5</sup>



Figure 7: Measuring the church of Daming  
(© Thomas Coomans, July 2014)

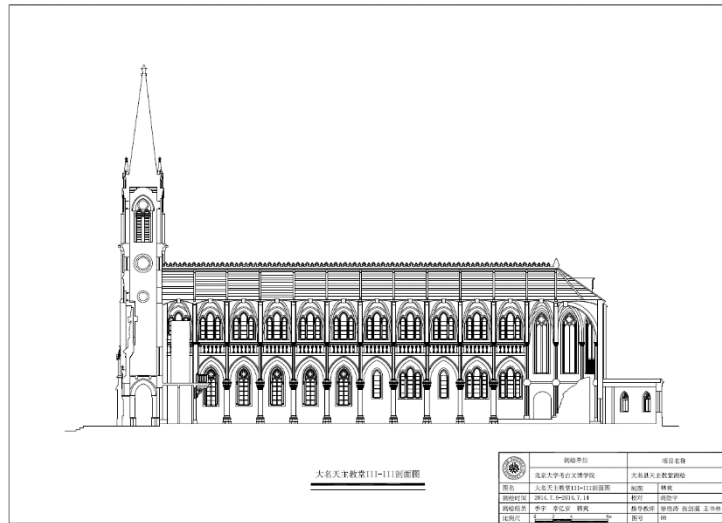


Figure 8: Section of the church of Daming  
(© Peking University, School of Archaeology and Museology, 2014)

Hand measurements, total station, and even a drone were used for recording the church.<sup>6</sup> (Figures 7 and 8) The accurate analysis of the building ---the material source--- provided unexpected information about how Western and Chinese techniques influenced each other. Prima facie, the church looks hundred percent Gothic, with its vertical lines, pointed arches, buttressing systems, tower, high spire, etc. The church, however, was constructed by Chinese, who not only learned from missionaries such as father Jung, but also improved techniques by using their knowledge. This is particularly evident for the bricks, which are red (Western) at the outer side of the walls and dark grey (Chinese) inside the church. Attention focused on the formats and profiles of bricks and other molded brick elements of the traceries, outer friezes, triforium, shafts and nerves, tower, etc., which reveal a great diversity and high production technology as well as perfect assembling. No Chinese decorative motive, however, has been traced in the church, while older brick buildings in the Jesuit College's compound include Chinese decorative elements. The vaulting of the nave is a wooden imitation of Gothic brick rib vaults. Because of its light weight and pressure on the walls, the buttressing system of the church is limited. The granite columns of the nave are monolithic and all the bases and hook capitals are sculpted in granite too. Most interesting is the roof: Western trusses, with a painted Chinese numbering system, are supporting a saddle roof. The grey Chinese roof tiles are placed with their concave side turned to the sky (仰瓦 *yangwa*).

The handbook often mentions Chinese terms, but they are written in the French Romanized form that was used in the 1920s; many are phonetic transcriptions of local dialect. Therefore, local workers were interviewed about traditional construction terminology and so the 149 technical terms of the handbook could be identified and translated to *putonghua* (Mandarin standard).

<sup>5</sup> R.P. Paulo Jung S.J. *superiore collegii Taming patrino fungente* / (...).

<sup>6</sup> With thanks to Zhang Jianwei and Wang Shulin for helping organizing the workshop.

Further research revealed that the cathedral of Jilin 吉林 (Jilin province), about 1.200 km north-east from Daming, built at the same time by French missionaries of the Foreign Missions of Paris (MEP), has exactly the same tower and elevation of the nave as the church of Daming. This comparison proves that plans and the handbook circulated, contributing spreading the French Gothic paradigm through Northern China. Next summer schools will develop building archaeological research and analyse further how Western building techniques were adapted to Chinese construction tradition.

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